The "California Program"

Today's alternative for a healthier environment…reducing petroleum dependence…paving the way to zero-emission fuel-cell vehicles

Cleaning Up Communities All Across California

California is the national leader in NGV deployment with more than 20,000 vehicles

Transit buses	*Refuse trucks*	*School buses*
18-wheelers	*Delivery trucks*	*Shuttle buses*
Street sweepers	*Taxi fleets*	*Police fleets*
Municipal fleets	*Passenger cars, trucks and vans*	

Goal

- Build a sustainable future for natural gas as a transportation fuel
  - Define stakeholders
  - Define sustainability for each
  - "Export" California thinking
- Position the NGV industry as the "path to hydrogen"
  - A real opportunity – not just hype

NGV Stakeholders – Mid 90's

- OEMs
  - LD OEMs (Ford, GM, Chrysler, Toyoto, Honda)
  - HD Engines (Cummins, Deere, CAT)
  - Conversion Industry (NGV Ecotrans)
- Utilities
  - PG&E
  - SoCalGas
  - SDG&E
- Fuel Providers
  - Pickens Fuel Corp.

Expanded NGV Stakeholders - Today

- Expanded Traditional (OEMs, utilities, fuel providers)
- Others
  - Air Pollution Control Districts
  - California Agencies (CEC and CARB)
  - Federal Agencies (DOE, NREL, EPA)
  - Equipment Suppliers
  - Fleets
  - Cities and Municipalities
  - Environmental Community
  - "State of California"

California
NGV
Coalition ???

California NGV
Partnership

OEM Needs

- Product sales to support manufacturing
- Product sales to support new product development and product expansion

Fuel Providers Needs

- Station throughput to make existing stations profitable
- Station throughput to warrant capitalization of new stations
- New engine/vehicle products to expand market

Air Pollution Control Districts

- Viable transportation programs to achieve clean air goals
- Transportation initiatives to address health risks (PM)
- Transportation initiatives to address Environmental Justice issues

California Energy Commission

- Energy security for California
- Fuel diversity
- Petroleum Dependence Report recommendations
  - Reduce petroleum use by 15% over 2003 use levels
  - Increase alternative fuels by 30% by 2030

California Air Resources Board

- Transportation measures to achieve SIP goals
- Transportation initiatives to reduce health risks
  - Transit Rule
  - PM Retrofit Rule for Refuse Trucks
  - Environmental Justice

Environmental Community

- Achieve Clean Air
- Reduce health risks
- Environmental Justice Issues

Growth

California NGVs

- 20,000+ NGVs
- 4,000+ HD vehicles
  - 3,000 Transit and School Buses
  - 1,000 HD (Refuse to Class 8 Tractors
- 16,000+ Light-duty vehicles

California Infrastructure

Region	CNG		LNG
	Total	Public	(Public)
N. Calif. (PG&E)	30	22	9
S. Calif. (SoCalGas)	145	50	9
S. Calif. (Long Beach)	4	4	1
San Diego (SDG&E)	26	4	2
Southwest Gas	1	1	1
TOTALS	206	81	22

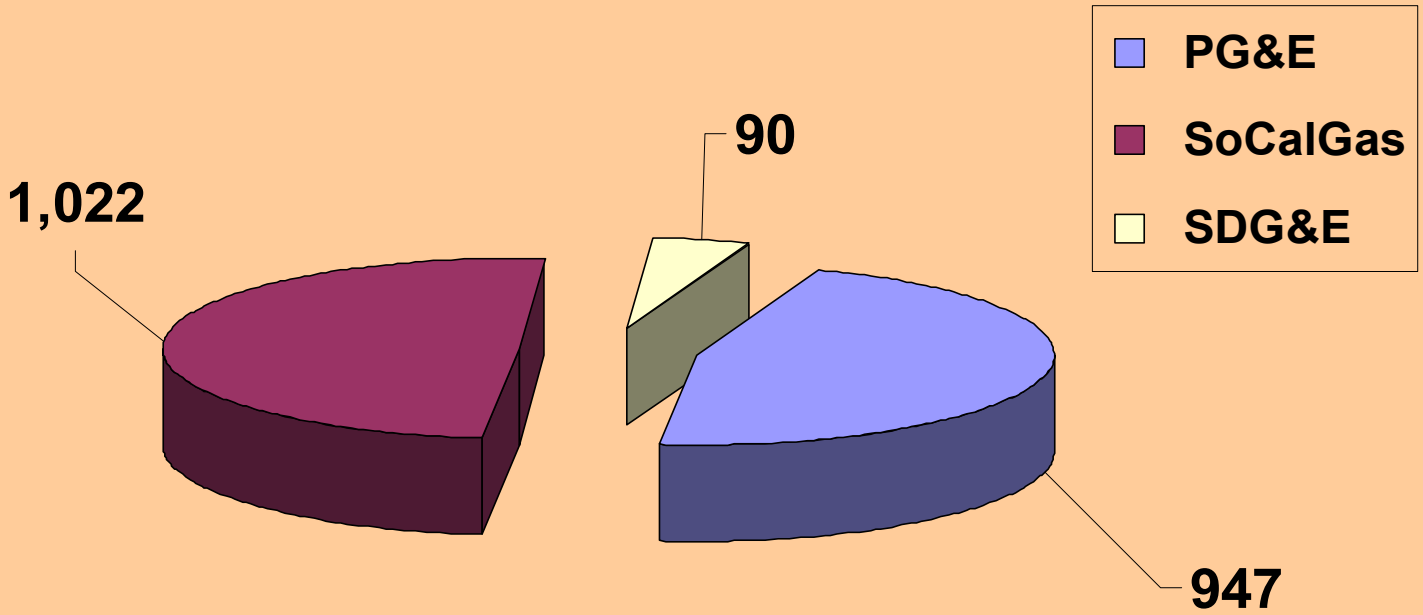
SoCalGas Growth

	1996	2002
NGV Throughput (Therms)	8,130,000	55,500,000
Number of NGV Customer Accounts	300	1000+
Light-duty Vehicles in service	4,500	12,000
Heavy-duty Vehicles in service	200	3,000
Total NGV Stations	81	159
Public Access Stations	36	64
Private Stations	45	95
Number of SoCalGas fleet stations	11	16

SDG&E Growth

	1996	2002
NGV Throughput (Therms)	2,300,000	6,700,000
Number of NGV Customer Accounts	80	150+
Fuel Cards Issued	2,500	4,000
Light-duty Vehicles in service	1,500	2,100
Heavy-duty Vehicles in service	30	400
Total NGV Stations	24	26
Public Access Stations	9	6
Private Stations	15	20
Number of SDG&E fleet stations	5	5

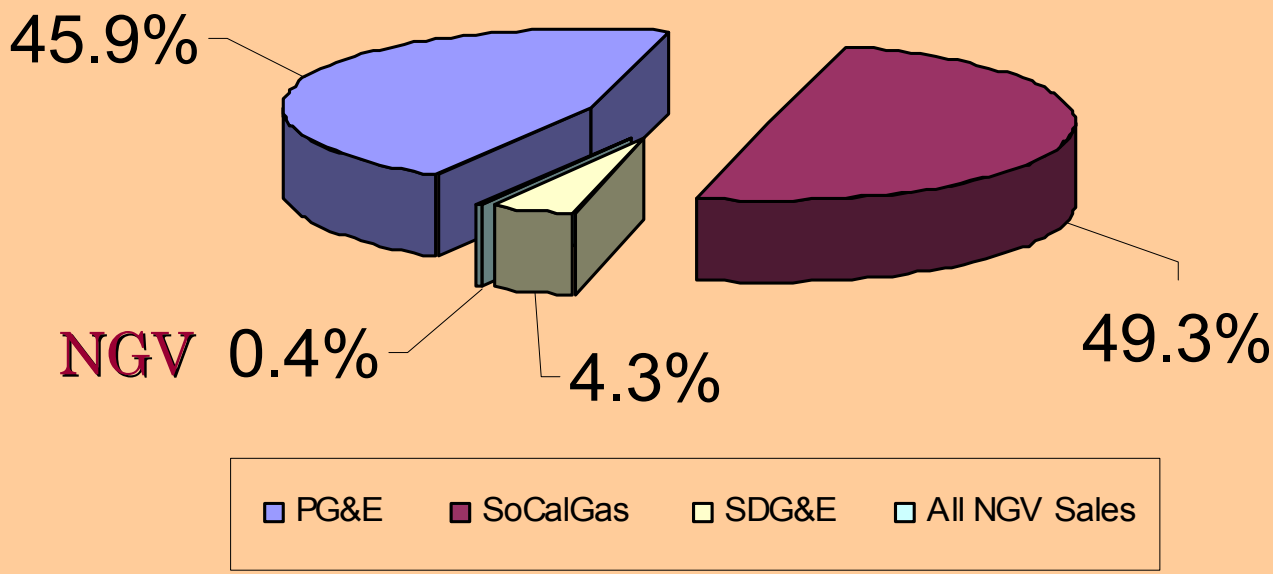
Total 2002 California Natural Gas Sendout



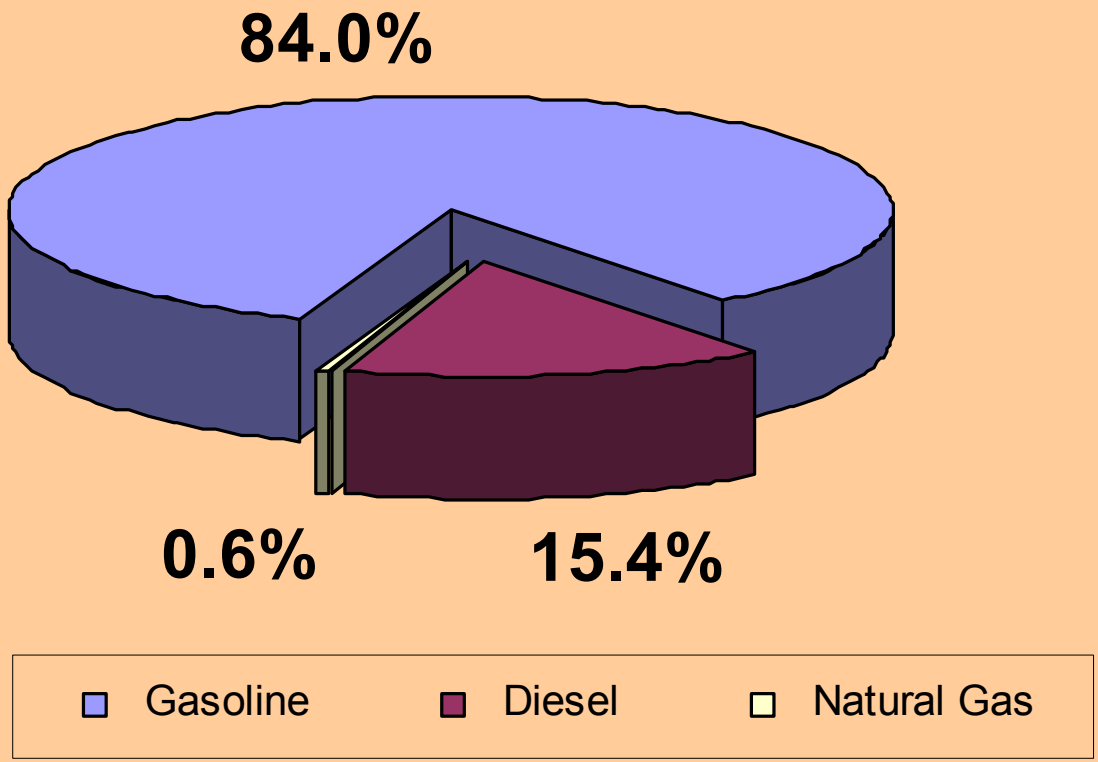
Total 2,058 BCF

Calif. Natural Gas as Transportation Fuel

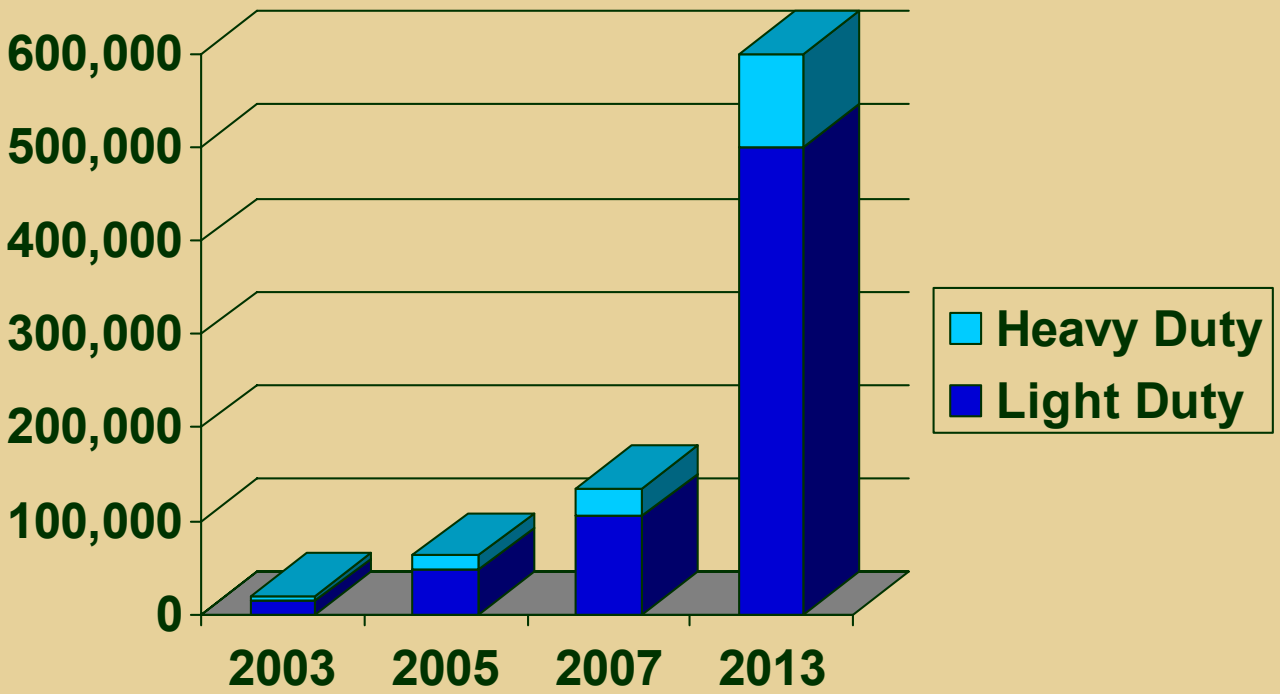
NGVs = 8BCF per year load



Liquid Fuel Displacement



Growth of NGVs



Source: California NGV Partnership

Infrastructure Requirements

	Total HD Vehicles	LD CNG Vehicles	Diesel Displaced by HD LNG (Gal/yr)	Diesel Displaced by HD CNG (Gal/yr)	Gasoline Displaced by LD CNG (Gal/yr)
Currently	4,000	16,000	5,000,000	35,000,000	22,400,000
3-Year	10,000	33,000	40,500,000	49,500,000	39,600,000
5-Year	25,000	90,000	136,000,000	64,000,000	90,000,000
10-Year	100,000	500,000	375,000,000	125,000,000	325,000,000
				500,000,000	325,000,000

Displace 500 million Gallons of Diesel per year

Displace 325 million Gallons of Gasoline per year

LNG Infrastructure Needed

Time	HD LNG Vehicles	Stations Required to Dispense Gallons per Day LNG					
		2,500	5,000	7,500	10,000	20,000	30,000
Today	500	8	4	3	2	1	1
3-Year Goal	4,500	92	46	31	23	11	8
5-Year Goal	17,000	309	154	103	77	39	26
10-Year Goal	75,000	851	425	284	213	106	71

Need to get here

LNG Production Capacity

Timing	LNG Production Capacity Needed
Today	20,000 gal/day
3 years	200,000 gal/day
5 years	650,000 gal/day
10 years	1.8 million gal/day

CNG,LNG, LCNG Infrastructure Needs

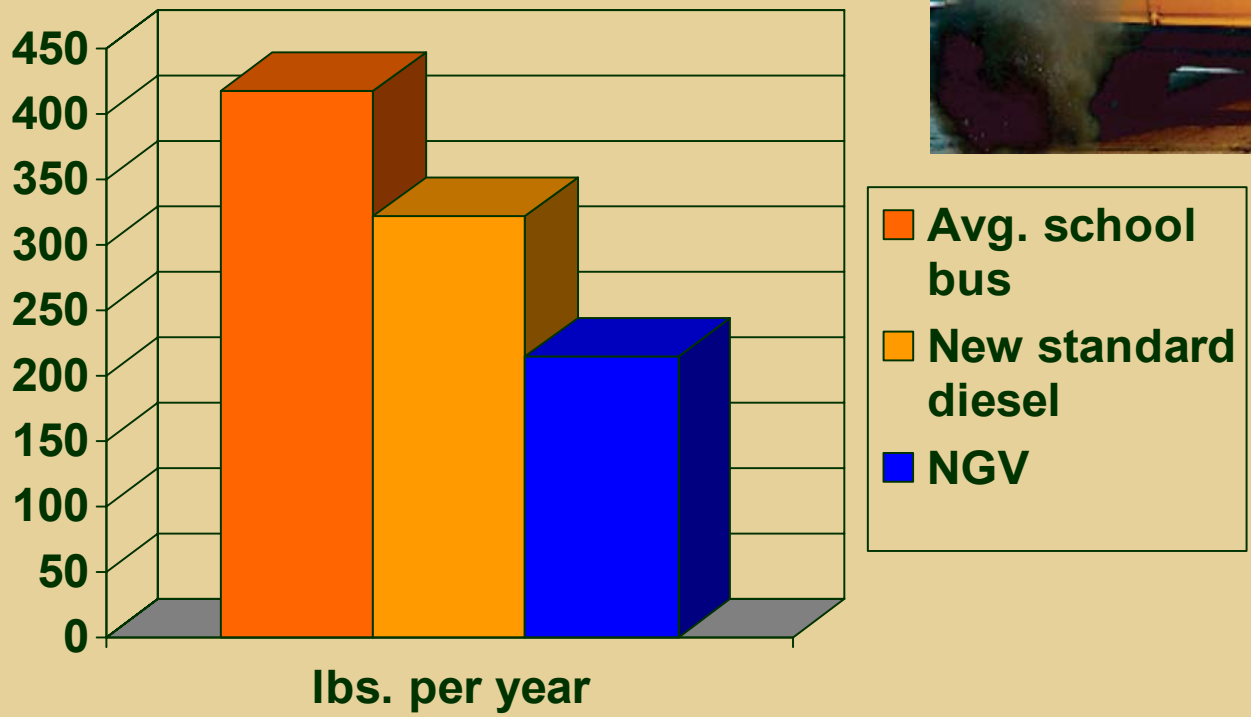
- Projected need for 1,200 to 1,400 stations for California
- Currently 8,500 gasoline/diesel retail stations in California
- Argentina – 540 stations supporting 1 million vehicles
- Germany looking at 1,000+ stations

"California Program" Exportable

- Environmental benefits for urban and rural areas
- Focus on high fuel use fleets
- Expand to other markets
- Coordinated industry effort with local, regional, state and federal efforts

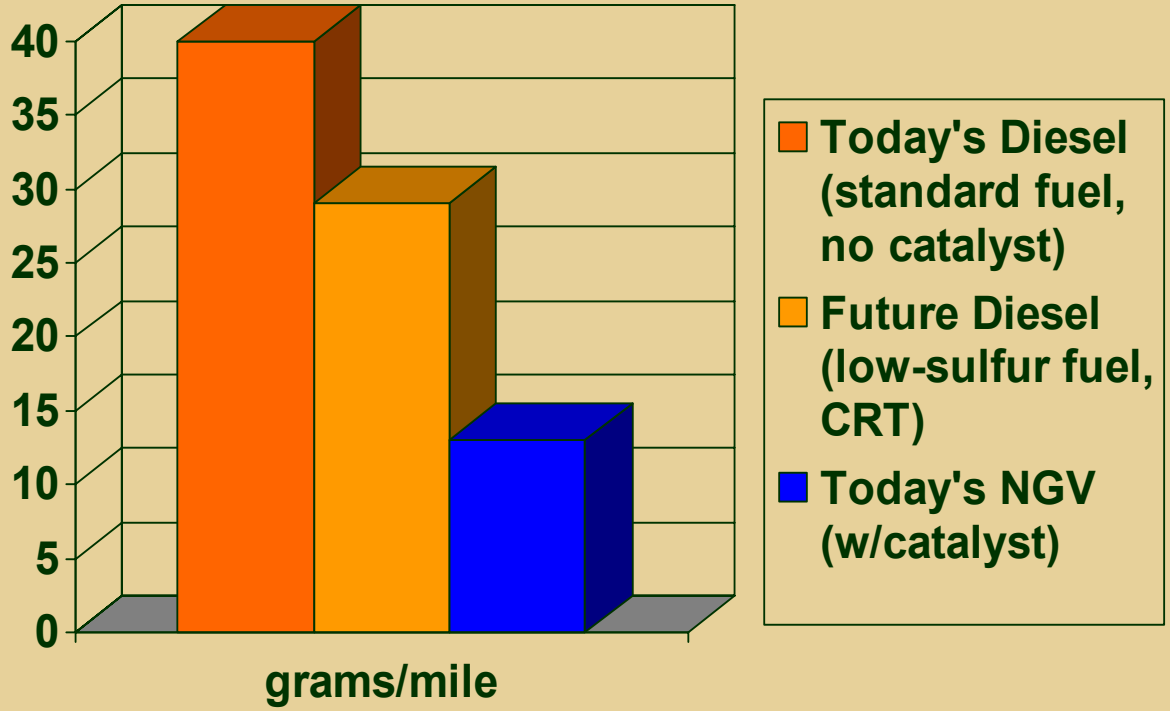
Environmental Benefits

NOx Emissions: School Buses



Source: Union of Concerned Scientists, 2002 "Pollution Report Card: Grading America's School Bus Fleets"

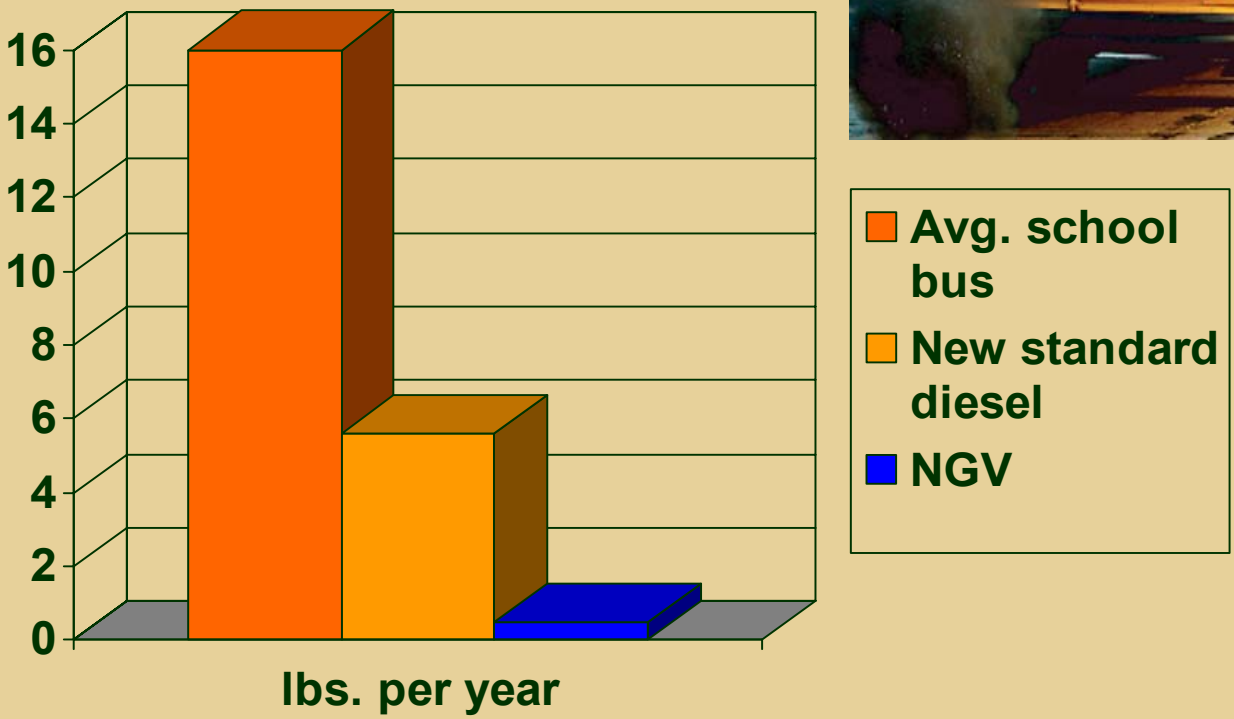
NOx Emissions: Transit Buses



Source: ARCO study, funded by NREL, CARB, BP, SCAQMD; CARB transit bus studies, 2002

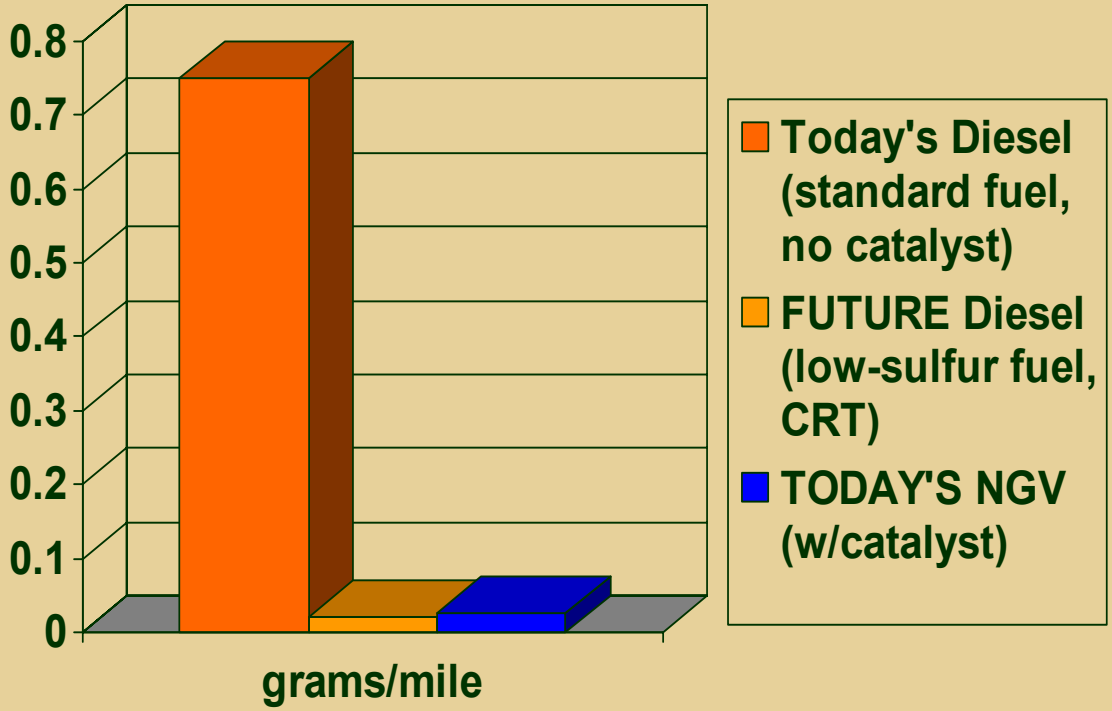
Particulate Matter: School Buses

PM is recognized by US EPA and CARB as a *known* carcinogen



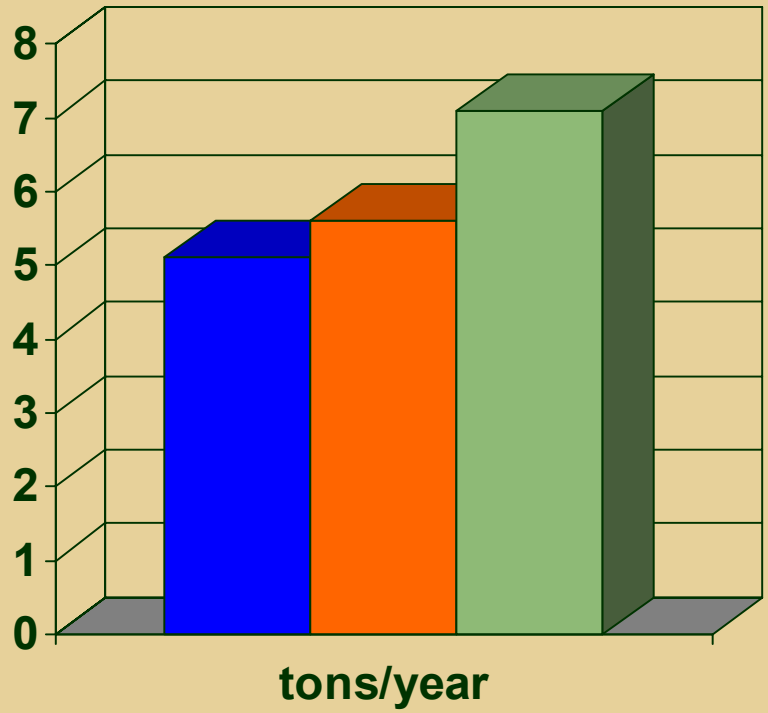
Source: Union of Concerned Scientists, 2002 "Pollution Report Card: Grading America's School Bus Fleets"

Particulate Matter: Transit Buses



Source: ARCO study, funded by NREL, CARB, BP, SCAQMD; CARB transit bus studies, 2002

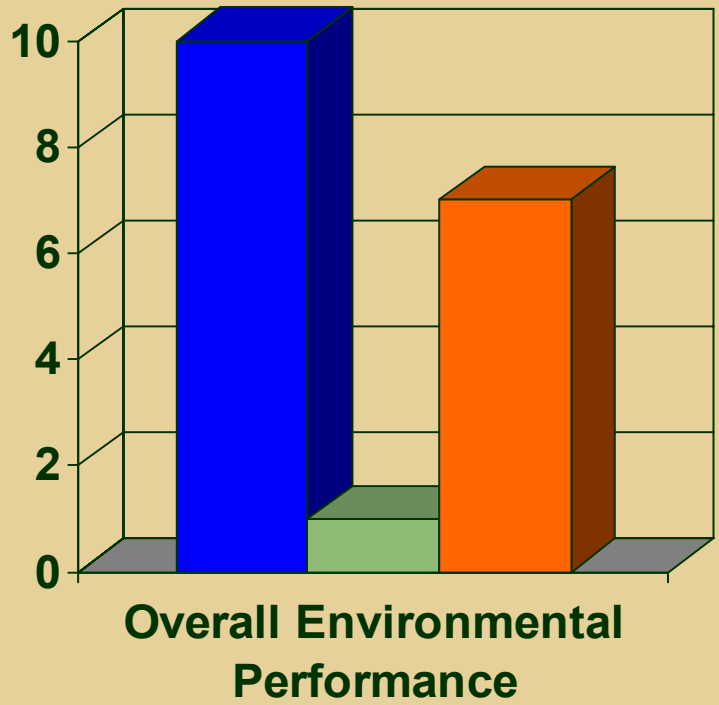
Greenhouse Gas Emissions



All cars 2002 models with automatic

Source: FuelEconomy.gov, US Department of Energy

Overall Environmental Performance (10 = best)



Cars rated on scale of 1–10 (worst to best) based on overall emissions

- Honda GX (NGV)
- VW New Beetle (Diesel)
- VW New Beetle (Gasoline)

Source: FuelEconomy.gov, US Department of Energy

Path to Hydrogen

NGVs: Key Path to Fuel Cells

- Current thinking at ARB regarding ZEVs:
  - Fuel cells are the ultimate destination – but mass production not feasible until at least 2011
  - In the interim, support vehicles that develop fuel cell components and technology – primarily, hybrids and NGVs

NGVs: Key Path to Fuel Cells

"The hydrogen can be produced from domestic sources -- initially, natural gas; eventually, biomass, ethanol, clean coal, or nuclear energy."

President George W. Bush, Feb. 2003

- Fueling Infrastructure
  - Fuel cells run on hydrogen – like natural gas, a high-pressure gaseous fuel
  - Natural gas most efficient way to produce hydrogen
  - NGV fueling stations will be adapted to hydrogen
    - Investment today pays off tomorrow

Home Refueling

- Convenient and safe
- Build consumer market
- Affordably priced
- Path to fuel cells
  - Today – NGVs
  - Tomorrow - FCVs